

CLAIMS SUMMARY

1. (Currently Amended) A stimulation lead to lie along and stimulate tissue comprising:

a sheath to be placed in the intrathecal space having a distal and proximal end;
at least one electrode along the exterior of the distal end of the sheath to lie along tissue;

a fixing element on the sheath configured to fix the electrodes in place along the tissue; and

a passage extending from an inlet at the proximal end of the sheath to one or more outlets at the distal end of the sheath; and
an optical fiber in the passage.

2. (Original) A lead according to Claim 1, wherein the fixing element includes at least one of inflatable balloon, nitinol, tines, and sheath shape.

3. (Original) A lead according to Claim 1, wherein the outlets are at one or more of the tip of the distal end, the adjacent to the tip of the distal end and on the electrode.

4. (Cancelled).

5. (Currently Amended) ~~A lead according to Claim 1, including~~ A stimulation lead to lie along and stimulate tissue comprising:

a sheath to be placed in the intrathecal space having a distal and proximal end;
at least one electrode along the exterior of the distal end of the sheath to lie along tissue;

a fixing element on the sheath configured to fix the electrodes in place along the tissue;

a passage extending from an inlet at the proximal end of the sheath to one or more outlets at the distal end of the sheath; and

one or more optical channels extending from a port on the proximal end of the sheath to a port at the distal end of the sheath.

6. (Original) A lead according to Claim 5, wherein the port at the distal end is at one or more of the tip of the distal end, adjacent to the tip of the distal end and on one or more of the electrode contacts.

7. (Currently Amended) A stimulation lead to lie along and stimulate tissue comprising:
a sheath to be placed in the intrathecal space having a distal and proximal end;
at least one electrode along the exterior of the distal end of the sheath to lie along tissue;
a fixing element on the sheath configured to fix the electrodes in place along the tissue;
a passage extending from an inlet at the proximal end of the sheath to one or more outlets at the distal end of the sheath; A lead according to Claim 1, including
a wire extension extending from a distal portion of the sheath to the proximal end of the sheath;
-an additional electrode on the wire extension and spaced from the at least three electrodes spaced along the exterior of the sheath; and
the additional electrode having a surface area length on the sheath greater than the surface area of each of the at least three electrodes.

8. (Original) A lead according to Claim 7, wherein the additional electrode is at least twice the surface area of the at least three electrodes.

9. (Original) A lead according to Claim 7, wherein the additional electrode is spaced from the at least three electrodes by at least ten millimeters.

10. (Cancelled).

11. (Currently Amended) A lead according to Claim ~~1~~7, including at least three electrodes spaced along the exterior of the sheath, and the electrodes each extend no greater than 270 degrees about the exterior of the sheath.

12. (Currently Amended) A lead according to Claim ~~1~~7, including at least three electrodes spaced along the exterior of the sheath, and the electrodes each extend no greater than 90 degrees about the exterior of the sheath.

13. (Currently Amended) A lead according to Claim ~~1~~7, including at least three electrodes spaced along the exterior of the sheath, and the electrodes each extend no greater than 60 degrees about the exterior of the sheath.

14. (Currently Amended) A method of neurostimulation using a catheter electrode assembly including a sheath having a distal and proximal end, at least three in-line electrodes spaced along the exterior of the distal end of the sheath to lie in-line along the spinal cord, and a fixing element configured to fix the electrodes in place along the spinal cord; the method comprising:

inserting a catheter electrode assembly, whose electrodes each extend no greater than 60 degrees about the exterior of the sheath, into the intrathecal space and positioning adjacent a spinal cord where it enters the spinal cord;

fixing the electrodes at a desired location along the spinal cord using the fixing element; and

providing stimulation pulses to a selected pair of electrodes.

15. (Original) The method according to Claim 14, wherein the catheter includes a passage with one or more ports at a distal end of the catheter and including administering a drug through the passage.

16. (Cancelled)

17. (Currently Amended) ~~The method according to Claim 14, wherein the~~
method of neurostimulation using a catheter electrode assembly including a sheath having a distal and proximal end, at least three in-line electrodes spaced along the exterior of the distal end of the sheath to lie in-line along the spinal cord, and a fixing element configured to fix the electrodes in place along the spinal cord; the method comprising:

inserting a catheter electrode assembly, whose electrodes each extend no greater than 90 degrees about the exterior of the sheath, into the intrathecal space and positioning the electrodes are positioned along a midline of the spinal cord;

fixing the electrodes at a desired location along the spinal cord using the fixing element; and

providing stimulation pulses to a selected pair of electrodes.

18. (Original) The method according to Claim 14, wherein the catheter includes an optical channel with one or more ports at a distal end of the catheter and including providing stimulating pulse of photonic energy to the optical channel in combination with or in lieu of the pulses to the electrodes.

19. (Currently Amended) A catheter to lie along and stimulate tissue comprising:
a sheath having a distal and proximal end;
at least one electrode along the exterior of the distal end of the sheath to lie along
tissue; and
a passage extending from an inlet at the proximal end of the sheath to one or more
outlets at the distal end of the sheath; and
an optical fiber in the passage.

20. (Original) A lead according to Claim 19, wherein the outlets are at one or
more of the tip of the distal end, the adjacent to the tip of the distal end and on the electrode.

21. (Cancelled).

22. (Currently Amended) ~~A lead according to Claim 19, including~~ A catheter to
lie along and stimulate tissue comprising:
a sheath having a distal and proximal end;
at least one electrode along the exterior of the distal end of the sheath to lie along
tissue;
a passage extending from an inlet at the proximal end of the sheath to one or more
outlets at the distal end of the sheath; and

one or more optical channels extending from a port at the proximal end of the sheath
to a port at the distal end of the sheath.

23. (Original) A lead according to Claim 22, wherein the port at the distal end
is at one or more of the tip of the distal end, adjacent to the tip of the distal end and on one or
more of the electrode contacts.

24. (New) A lead according to Claim 7, including at least three electrodes spaced
along the exterior of the sheath, and the electrodes each extend no greater than 270 degrees
about the exterior of the sheath.